



University of  
**Strathclyde**  
Glasgow

# HILT: Enhancing subject search through embedded web services

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Edinburgh International Conference Centre



# Outline

1. Background to HILT
2. Pilot Toolkit (main project deliverable)
  - various functions
3. Demonstration of Toolkit in action
  - Use within a real service - Intute
4. Future of HILT

# HILT: Background

- HILT began in 2000
- Subject interoperability problem: soil/earth/terra firma!
- Distributed architecture
- SRU/W
- SKOS

# Mapping Approach

High vs Deep Level  
Mapping

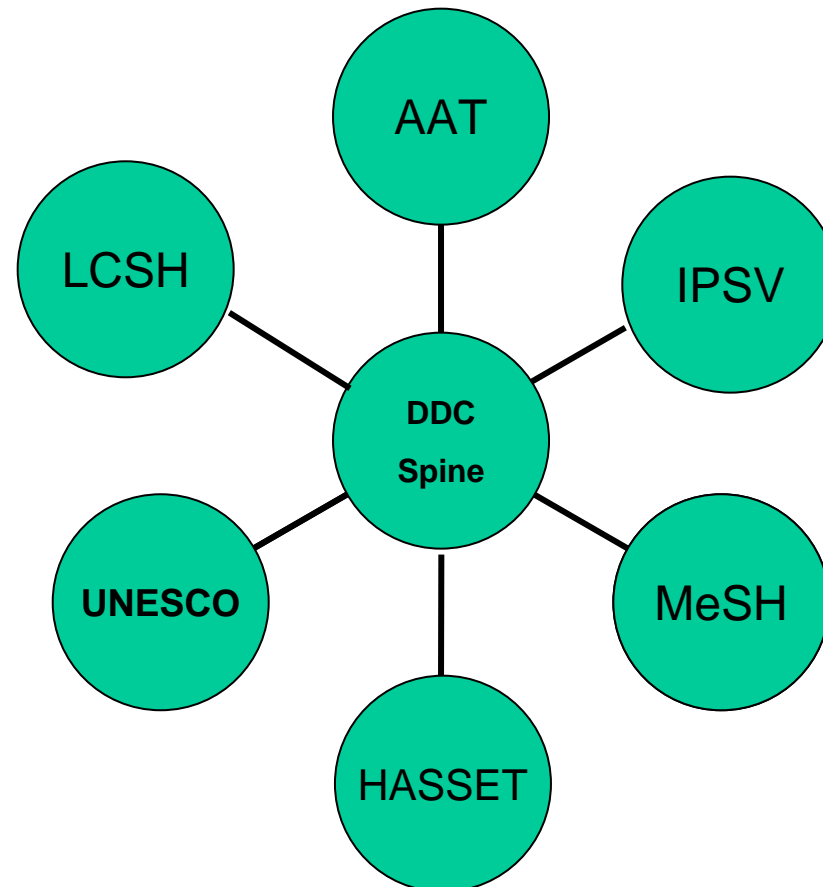
Folksonomies

Mapping Types

Local Schemes

SKOS

Limitations



# HILT APIs

[http://hilt4.cdjr.strath.ac.uk/hilt\\_sru.cgi](http://hilt4.cdjr.strath.ac.uk/hilt_sru.cgi)

## SRU Functions

- get\_collections
- get\_ddc\_records
- get\_non\_ddc\_records
- get\_all\_records
- get\_filtered\_set (browse hierarchies)
- get\_sp\_suggestions (spelling suggestions)
- get\_wordnet\_suggestions



Enter your search term/dewey number here...

☐ Get related concepts

Use double quotes for phrase search. Input Dewey Number for `get_non_ddc_records` and `get_collections`. See [search tips](#) for details

Select schemes and type of terms to search (use CTRL for multiple selection) - **required only for `get_filtered_set`**

DDC

AAT

GCMD

HASSET

IPSV

JACS

LCSH

MeSH

NMR

SPEIR

UNESCO

☒ Preferred Terms ☒ Non Preferred Terms ☒ Related Terms

☐ Search for Id?



## Result for get\_collections (DDC 621.8)

```
<zs:record>
  <zs:recordData>
    <dcmitype:Collection xmlns:cld="http://purl.org/cld/terms/" xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:dcmitype="http://purl.org/dc/dcmitype/" xmlns:dcterms="http://purl.org/dc/terms/"
xmlns:iesr="http://iesr.ac.uk/terms/#usesControlledList" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance">

      <cld:isAccessedVia>http://www.intute.ac.uk/sciences/cgi-
bin/search.pl?gateway=Engineering&limit=0&term1=
```

# get\_non\_ddc\_records

- Retrieves terms mapped to a DDC notation, from other schemes.
- Combines with get\_ddc\_records to create the get\_all\_records API



## Result for get\_non\_ddc (581.652)

```
<zs:record>
  <zs:recordData>
    <skos:Concept rdf:about="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/DDC.rdf#581.652"
      xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:skos="http://www.w3.org/2008/05/skos#">
      <skos:EXACTMATCH>
        <skos:Concept rdf:about="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/LCSH.rdf#26433" />
      </skos:EXACTMATCH>
      <skos:altLabel xml:lang="en">Weeds</skos:altLabel>
      <skos:exactMatch>
        <skos:Concept rdf:about="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/LCSH.rdf#26434" />
      </skos:exactMatch>
      <skos:exactMatch>
        <skos:Concept rdf:about="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/GCMD.rdf#24" />
      </skos:exactMatch>
      <skos:exactMatch>
        <skos:Concept rdf:about="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/HASSET.rdf#7011" />
      </skos:exactMatch>
      <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/DDC.rdf" />
      <skos:prefLabel xml:lang="zxx">581.652</skos:prefLabel>
    </skos:Concept>
  </zs:recordData>
  <zs:recordPacking>xml</zs:recordPacking>
  <zs:recordPosition>1</zs:recordPosition>
</zs:record>
```

# get\_filtered\_set

- Allows specified fields from specific terminologies or combinations of terminologies to be searched.
- Additional parameters can be selected e.g. NPT, RT
- Accepts a subject term



(Partial) result for 'pottery' searching AAT using get\_filtered\_set. Pref labels for BTs and NTs can be retrieved by clicking 'get related concepts' when entering search term.

<zs:record>

<zs:recordPacking>xml</zs:recordPacking>

- <zs:recordData>

- <skos:Concept xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:skos="http://www.w3.org/2004/02/skos/core.rdf#" rdf:about="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/AAT.rdf#300112569">

<skos:prefLabel xml:lang="en">British Isles Medieval pottery styles</skos:prefLabel>

<skos:broader rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/AAT.rdf#300020794" />

<skos:narrower rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/AAT.rdf#300069526" />

<skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/AAT.rdf" />

</skos:Concept>

</zs:recordData>

<zs:recordPosition>1</zs:recordPosition>

</zs:record>

- <zs:record>

<zs:recordPacking>xml</zs:recordPacking>

- <zs:recordData>

- <skos:Concept xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:skos="http://www.w3.org/2004/02/skos/core.rdf#" rdf:about="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/AAT.rdf#300106969">

<skos:prefLabel xml:lang="en">Italian Medieval pottery styles</skos:prefLabel>

<skos:broader rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/AAT.rdf#300106965" />

<skos:narrower rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/AAT.rdf#300021115" />

<skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hilt4/schemes/AAT.rdf" />

</skos:Concept>

</zs:recordData>

<zs:recordPosition>2</zs:recordPosition>

</zs:record>

# Uses of HILT

- Identifying potentially useful collections from a user's subject term (via registries such as IESR).
- Provision of synonyms and related terms (Improving recall).
- Providing the best term(s) for a subject search in a remote service that uses a subject scheme unfamiliar to users.
- The ability to send a term from a chosen subject scheme and receive back data on broader terms, narrower terms, hierarchy information, preferred and non-preferred terms, and so on.

# Uses of HILT (2)

- Providing cataloguing staff with information on subject schemes and inter-scheme mappings to assist in metadata creation.
- A spell-check mechanism to assist user searching (of HILT terms).
- Generating an interactive browse structure where a scheme is arranged hierarchically.
- A service to assist user search formulation by providing information on search terms entered (e.g. what the term means, whether it has alternative meanings, whether there are synonyms that might be useful in a search and so on).

# Toolkit Demonstration

Hopefully live....

<http://hilt4.cdlr.strath.ac.uk/toolkit/intro.cgi>

# Toolkit Demonstration (1)



This toolkit helps you to enhance your search results by embedding Hilt functions within your local search service.

- Page1 - your\_search.cgi mimics your search page ...expand...
- Page2 - your\_search\_results.cgi will be your search result page. Hilt can enhance your result page by providing spelling suggestions, wordnet suggestions and alternate search terms. This page calls three hilt functions get\_sp\_suggestions, get\_wordnet\_suggestions and get\_filtered\_get to get these results...
- Page3 - search\_hilt.cgi uses get\_ddc\_records to clarify users topic of interest...
- page4 - search\_jsc.cgi searches within local collections database to find out collections relevant to users search term (using get\_collection function) and any term to search that collection based on the subject scheme used in that collection (uses get\_non\_ddc\_records function)....

You can search the collection directly if a low level mapping term is identified and open urls are available to search the collection. You can also browse the collection if a high level mapping term is identified.

A script is available to search within IESR records(search\_jesr.cgi). Because Not many IESR records have scheme information and open url information, Hilt cannot complete the task using IESR records. That's why we are using a local collections database....

You can use this interface to create your own SRU/W requests: [Hilt SRU/W](#)

➡ [Proceed to toolkit demo](#)

# Toolkit Demonstration (2)



This page mimics a services local search page

Enter your search term here...



# Toolkit Demonstration (3)



Hilt is providing spelling suggestions and alternative search terms with which to search collections/services.

Enter your search term here...

Alternate search terms	Spelling suggestions	Wordnet suggestions
<p><a href="#">predation (biology)--rats</a>, <a href="#">predation (biology)--sharks--art representation</a>, <a href="#">predation (biology)--snakes</a>, <a href="#">predation (biology)--tigers</a>, <a href="#">predation (biology)--wolves</a>.</p>	<p><a href="#">redaction</a>  <a href="#">prediction</a>  <a href="#">depredation</a>  <a href="#">sedation</a>  <a href="#">predator</a></p>	<p>predation, depredation, preying -- (an act of plundering)</p>

[Next part of the illustration](#)

Your local search results for '**predation**' will be displayed here



# Toolkit Demonstration (4)



Hilt can help clarify what the user's chosen subject is for a local search or an external search. DN to expand-  
Click on one of the links to retrieve collections corresponding to that term

Enter your search term here...

Search

Click on a link to retrieve collections relevant to that term

## [1. Predation](#)

Top of Dewey22 > Natural sciences and mathematics > Life sciences Biology > Natural history of specific kinds of organisms > Plants and animals > Animals (Zoology) > Specific topics in natural history of animals > Behavior > Feeding behavior > Predation

## [2. Predation \(Biology\)--snakes](#)

Top of Dewey22 > Natural sciences and mathematics > Life sciences Biology > Natural history of specific kinds of organisms > Plants and animals > Animals (Zoology) > Specific taxonomic groups of animals > Cold-blooded vertebrates Pisces (Fishes) > Reptilia (Reptiles) > Lepidosauria > Squamata (Scaly reptiles) > Serpentes (Snakes) > Predation (Biology)--snakes

## [3. Predation \(Biology\)--rats](#)

Top of Dewey22 > Natural sciences and mathematics > Life sciences Biology > Natural history of specific kinds of organisms > Plants and animals > Animals (Zoology) > Specific taxonomic groups of animals > Mammalia (Mammals) > Eutheria (Placental mammals) > Miscellaneous orders of Eutheria (placental mammals) > Rodentia (Rodents) > Muridae > Rattus (Common rats) > Predation (Biology)--rats

## [4. Predation \(Biology\)--tigers](#)

Top of Dewey22 > Natural sciences and mathematics > Life sciences Biology > Natural history of specific kinds of organisms > Plants and animals > Animals (Zoology) > Specific taxonomic groups of animals > Mammalia (Mammals) > Eutheria (Placental mammals) > Carnivora Fissipedia (Land carnivores) > Fissipedia (Land carnivores) > Felidae (Cat family) > Panthera tigris (Tiger) > Predation (Biology)--tigers

## [5. Predation \(Biology\)--wolves](#)

Top of Dewey22 > Natural sciences and mathematics > Life sciences Biology > Natural history of specific kinds of organisms > Plants and animals > Animals (Zoology) > Specific taxonomic groups of animals > Mammalia (Mammals) > Eutheria (Placental mammals) > Carnivora Fissipedia (Land carnivores) > Fissipedia (Land carnivores) > Canidae (Dog family) > Canis lupus and Canis rufus (red wolf) > Predation (Biology)--wolves

## [6. Predation \(Biology\)--sharks--art representation](#)

Top of Dewey22 > The arts Fine and decorative arts > Standard subdivisions of fine and decorative arts > Special topics in fine and decorative arts > Iconography > Specific subjects > Nature and still life > Animals > Specific animals > Fishes--art representation > Predation (Biology)--sharks--art representation

## [7. Physiology of predatory activity](#)

Top of Dewey22 > Natural sciences and mathematics > Life sciences Biology > Internal biological processes and structures > Specific parts of and physiological systems in plants > Reproductive organs and physiological systems in plants > Animal-like physiological processes > Physiology of predatory activity

# Toolkit Demonstration (5)



Hilt has searched in JISC collections database to find collections relevant to your search term. These are displayed below. Any suggested terms to search the collection with are also displayed. Any deep level mapping term allows you to search the collections directly (if available) and any high level mapping term allows you to browse the scheme from that particular point and then search the collection once you identify a useful term.

Enter your search term here...

Search

Your search term in Dewey hierarchy

BT: Feeding behavior

**Predation** (Dewey no:591.53)

NT: Predatory aquatic animals

Results from JISC collections/services database

1. [BUBL LINK: Zoology](#)

Catalogue of selected Internet resources.

Dewey no: 590

Taxonomy:

2. [Intute: Health and Life Sciences: Natural History](#)

The natural history pages of Intute. A free online service providing access to the very best web resources for education and research, evaluated and selected by a network of subject specialists.

Dewey no:

590

Taxonomy:

CAB; LCC; MeSH; HASSET;

[Predatory Behavior](#)

Search *Intute: Health and Life Sciences: Natural History* using following terms:

[Feeding Behavior](#)

[Cannibalism](#)

Browse *Intute: Health and Life Sciences: Natural History* using following terms:

[ZOOGEOGRAPHY](#) OR [ZOOPATHOLOGY](#)

[ZOOLOGY](#)

3. [COPAC](#)

COPAC provides free access to the merged catalogues of 22 major university research libraries in the UK and Ireland. It offers a single point of access to details of materials held in many different locations, bringing together the strength of individual

Dewey no: 500

# Toolkit Demonstration (6)

Taxonomy: LCSH;

8. [Intute: Health and Life Sciences: Psci-com](#)


Psci-com is a free catalogue of high quality Internet resources, covering public engagement with science and the impact of science on society. In addition, Psci-com provides a calendar of events, a bibliography Psci-comLit of references to books, reports, journal and newspaper articles and a link to the Psci-com Dewey no: 500

Taxonomy: CAB; LCC; MeSH; [Predatory Behavior](#)

Search *Intute: Health and Life Sciences: Psci-com* using following terms: [Feeding Behavior](#) [Cannibalism](#)

HILT phase IV - Toolkit demo - Mozilla Fir...

http://hilt4.cdli.strath.ac.uk/toolkit/help.cgi?term=Pi




Collection has been searched with suggested term [Predatory Behavior](#) and results are displayed in the screen below.

Done

Intute: Health and Life Sciences - Search results - Mozilla Firefox

http://www.intute.ac.uk/healthandlivesciences/cgi-bin/search.pl?gateway=psicom&limit=0&term1=Predatory Behavior



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Intute > Health and Life Sciences > Psci-com > Search > Results

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Done

# Toolkit Demonstration (7)

Results from JISC collections/services database

1. [BUBL LINK: Zoology](#)  
Catalogue of selected Internet resources.  
Dewey no: 590  
Taxonomy:
2. [Intute: Health and Life Sciences: Natural History](#)  
The natural history pages of Intute. A free online service providing access to the very best web resource research, evaluated and selected by a network of subject specialists.  
Dewey no: 590  
Taxonomy: CAB: LGG: M-SU

HILT phase IV - Toolkit demo - Mozilla Fir...

http://hilt4.cdli.strath.ac.uk/toolkit/browse\_schemes

Search collection 'Intute: Health and Life Sciences: Natural History' for this term  
[ZOOLOGY](#)

Click on a link to continue browse

BT: [BIOLOGY](#)

**ZOOLOGY**

NT: [ANIMAL BEHAVIOUR](#)  
NT: [ANIMAL BREEDING](#)  
NT: [ORNITHOLOGY](#)  
NT: [ZOOGEOGRAPHY](#)  
NT: [ZOOPATHOLOGY](#)

NPT: ANIMAL BIOLOGY

Done

http://www.intute.ac.uk/healthandlifesciences/biologicalsciences/

**intute**  
best of the web

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[BioethicsWeb](#) | [MedHist](#) | [Psci-com](#)

Intute > Health and Life Sciences > Biological Sciences

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**Biological Sciences**

Welcome to the Biological Sciences pages of Intute. We are a free online service providing you with access to the very best web resources for education and research, [evaluated](#) and selected by a network of subject specialists.

# Intute

[http://www.intute.ac.uk/search\\_hilt.html](http://www.intute.ac.uk/search_hilt.html)

Again, hopefully live...



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skin

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## Search Results

Search  in

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Search term(s) **skin** [subject(s): **All**]

Related terms [max 10] [allergies](#) [skin](#) [skin cancer](#) [skin diseases](#) [skin types](#) [sunburn](#) [suntanning](#) [carcinoma](#) [skin appendage](#) [digestive, oral, and skin physiology](#) [galvanic skin response](#)

Intute catalogue results **473** [By group: **A** 110 **H** 328 **S** 31 **So** 4 [\(What's this?\)](#)]

Harvester results [View results](#) [\(What's this?\)](#)

Filter by resource type:

Go

**S** Sciences **A** Arts **So** Social **H** Health

Now showing: **1** - **25** of 473 records

Page: [1](#) [2](#) [3](#) [4](#) [5](#) ... [19](#) >> [Next](#)

Order by **Relevance** | [Alphabetical](#)

### [Skin treatment guide](#)

**A** [More details](#) [Save record](#)

The **Skin Treatment Guide** website contains brief overviews of a number of popular **skin** treatments including: Botox; Collagen injections; Laser treatments and Thermal treatments, with more detailed sections dedicated to Chemical Peels and Dermabrasion. There is also information on the negative effects of exposure to the sun, and the use of **skin** creams. A section on basic **skin** care covers aging, smoking and facial exercises, different **skin** types and rashes. There are natural **skin** care tips, with reference to nutrition, vitamins, free radicals and **skin** cancer, a feature section on acne, with reviews of the top five acne treatments, and a collection of **skin** care related articles.

<http://www.skin-treatment-guide.com/>

[Click here to rate this resource or leave a comment.](#)



# HILT: The Future

- JISC Shared Service
- Distributed approach
- Substantial mapping effort
- Link up with other terminology services?

# Tell us what you think!

<http://hilt.cdjr.strath.ac.uk/hilt4/demonstrators.html>

<http://hilt4.cdjr.strath.ac.uk/toolkit/intro.cgi>

<b>Emma McCulloch:</b>	<b><a href="mailto:e.mcculloch@strath.ac.uk">e.mcculloch@strath.ac.uk</a></b>
<b>Dennis Nicholson:</b>	<b><a href="mailto:d.m.nicholson@strath.ac.uk">d.m.nicholson@strath.ac.uk</a></b>
<b>Anu Joseph:</b>	<b><a href="mailto:anu.joseph@strath.ac.uk">anu.joseph@strath.ac.uk</a></b>

**HILT-Collaborators:** <http://www.jiscmail.ac.uk/>